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## ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 188144

Proj.  
ECN

2. ECN Category (mark one)		Supplemental <input type="checkbox"/>	Change ECN <input type="checkbox"/>	Supersedure <input type="checkbox"/>
Cancel/Void <input type="checkbox"/>	Direct Revision <input checked="" type="checkbox"/>	Temporary <input type="checkbox"/>	Discovery <input type="checkbox"/>	
3. Originator's Name, Organization, MSIN, and Telephone No. R. R. Lehrschall, Environmental Restoration Safety Support, N1-75, 376-6788			4. Date October 15, 1992	
5. Project Title/No./Work Order No. Volume 1: Activities Involving Drilling and Sampling of Contaminated Soils		6. Bldg./Sys./Fac. No. Hanford Site		7. Impact Level 2 ESQ
8. Document Number Affected (include rev. and sheet no.) WHC-SD-EN-SAD-016, Rev. 0, Vol. 1		9. Related ECN No(s). N/A		10. Related PO No. N/A
11a. Modification Work <input type="checkbox"/> Yes (fill out Blk. 11b) <input checked="" type="checkbox"/> No (NA Blks. 11b, 11c, 11d)	11b. Work Package Doc. No. N/A	11c. Complete Installation Work N/A		11d. Complete Restoration (Temp. ECN only) N/A
		Cog. Engineer Signature & Date		Cog. Engineer Signature & Date
12. Description of Change There are two changes to the baseline safety assessment document addressed in this ECN. The first change [operational safety limit (OSL) 2, "Monitoring for Volatile Gases"] addresses the actions that are to be initiated if combustible gas levels exceed 10% of the lower explosive limit. The change is required to allow different options for limiting increased gas concentrations in the borehole. Currently, there is only one option in the OSL addressing removal of combustible gases in the borehole. This requirement has been changed to implement the actions as required in the work procedures. The second change includes an additional prudent action recommending monitoring for flammable gases in the tank farms near areas where welding or cutting operations take place. This is recommended to assure concentrations of flammable gases that may vent from any single shell tank in the tank farms does not exceed the concentrations that could result in a fire or explosion at the well site.				
13a. Justification (mark one)		Criteria Change <input checked="" type="checkbox"/>	Environmental <input type="checkbox"/>	Facilitate Const. <input type="checkbox"/>
Design Error/Omission <input type="checkbox"/>	Design Improvement <input type="checkbox"/>	As-Found <input type="checkbox"/>	Const. Error/Omission <input type="checkbox"/>	
13b. Justification Details The changes to this document are for incorporating the additional actions required for minimizing the buildup of combustible gases in the borehole and also an additional prudent action addressing site worker safety.				
14. Distribution (include name, MSIN, and no. of copies)			RELEASE STAMP	
T. L. Bennington (1)	H4-16	N. R. Kerr (1)	N1-75	OFFICIAL RELEASE <b>20</b> BY WHC DATE OCT 23 1992 <i>Sta. 21</i>
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D. O. Hess (1)	L6-57	J. J. Zimmer (1)	N1-83	

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15. Design Verification Required [ ] Yes [X] No	16. Cost Impact		17. Schedule Impact (days)		
	ENGINEERING		CONSTRUCTION		
	Additional Savings	[ ] N/A [ ] N/A	Additional Savings	[ ] N/A [ ] N/A	
		Improvement	[ ] N/A	Delay	[ ] N/A

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

SDD/DD	[ ]	Seismic/Stress Analysis	[ ]	Tank Calibration Manual	[ ]
Functional Design Criteria	[ ]	Stress/Design Report	[ ]	Health Physics Procedure	[ ]
Operating Specification	[ ]	Interface Control Drawing	[ ]	Spares Multiple Unit Listing	[ ]
Criticality Specification	[ ]	Calibration Procedure	[ ]	Test Procedures/Specification	[ ]
Conceptual Design Report	[ ]	Installation Procedure	[ ]	Component Index	[ ]
Equipment Spec.	[ ]	Maintenance Procedure	[ ]	ASME Coded Item	[ ]
Const. Spec.	[ ]	Engineering Procedure	[ ]	Human Factor Consideration	[ ]
Procurement Spec.	[ ]	Operating Instruction	[ ]	Computer Software	[ ]
Vendor Information	[ ]	Operating Procedure	[ ]	Electric Circuit Schedule	[ ]
OM Manual	[ ]	Operational Safety Requirement	[ ]	ICRS Procedure	[ ]
FSAR/SAR	[ ]	IEFD Drawing	[ ]	Process Control Manual/Plan	[ ]
Safety Equipment List	[ ]	Cell Arrangement Drawing	[ ]	Process Flow Chart	[ ]
Radiation Work Permit	[ ]	Essential Material Specification	[ ]	Purchase Requisition	[ ]
Environmental Impact Statement	[ ]	Fac. Proc. Samp. Schedule	[ ]	Hazardous Waste Operations Permit	[X]
Environmental Report	[ ]	Inspection Plan	[ ]		[ ]
Environmental Permit	[ ]	Inventory Adjustment Request	[ ]		[ ]

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision
HWOP .057		

20. Approvals

Signature	Date	Signature	Date
OPERATIONS AND ENGINEERING		ARCHITECT-ENGINEER	
Cog./Project Engineer J. R. Freeman-Pollard	10-23-92	PE	
Cog./Project Engr. Mgr. R. A. Carlson	10/23/92	QA	
QA T. L. Bennington	10/22/92	Safety	
Safety M. A. Tredway		Design	
Security N/A		Other	
Proj. Prog./Dept. Mgr. N/A			
Def. React. Div. N/A			
Chem. Proc. Div. N/A			
Def. Wst. Mgmt. Div. N/A		DEPARTMENT OF ENERGY	
Adv. React. Dev. Div. N/A			
Proj. Dept. N/A			
Environ. Div. L. P. Diediker	10-22-92	ADDITIONAL	
IRM Dept. N/A			
Facility Rep. (Ops.) D. J. Moak	10/23/92		
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SUPPORTING DOCUMENT

1. Total Pages

2. Title

Title: Safety Assessment for Environmental Investigations and Site Characterizations Vol. 1: Activities Involving Drilling and Sampling of Contaminated Soils

3. Number

WHC-SD-EN-SAD-016, Vol. 1

4. Rev No.

0-A

5. Key Words

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**APPROVED FOR  
PUBLIC RELEASE**

6. Author

Name: R. R. Lehrschall

*R.R. Lehrschall*  
Signature

Organization/Charge Code 29550/HIBBE

7. Abstract

8. PURPOSE AND USE OF DOCUMENT - This document was prepared for use within the U.S. Department of Energy and its contractors. It is to be used only to perform, direct, or integrate work under U.S. Department of Energy contracts. This document is not approved for public release until reviewed.

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10. RELEASE STAMP

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9. Impact Level 2 ESQ

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RECORD OF REVISION

(1) Document Number

WHC-SD-EN-SAD-016,  
Vol. 1

Page 1

(2) Title

Main Title: Safety Assessment for Environmental Investigations and Site Characterizations  
Volume 1: Activities Involving Drilling and Sampling of Contaminated Soils

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release		
		(5) Cog. Engr.	(6) Cog. Mgr.	Date
0-A RS	(7) Replace page 3; second item from top revised.  Actions required by work procedures shall be implemented to reduce combustible gas levels below 10% LEL.	Per telecon R.R. Schubert for J.R. Freeman Pollard	Per telecon 10-23-92 R.R. Schubert for R.A. Carlson	
0-A	Replace page 4; addition of new Prudent Action (number 14) at bottom.  Monitoring for flammable gases should be in compliance with requirements in the operating specification document for watch list tanks.	Per telecon R.R. Schubert for J.R. Freeman Pollard	Per telecon 10-27-92 R.R. Schubert for R.A. Carlson	
0-A	Replace pages 5 and 6; text moved.	R.R. Schubert J.R. Freeman-Pollard	R.R. Schubert for R.A. Carlson	
0-A	Replace page 40; second item under "Mitigation" column in Table 6 revised.  Actions required by work procedures shall be implemented to reduce combustible gas levels below 10% LEL.	Per telecon R.R. Schubert for J.R. Freeman Pollard	Per telecon 10-25-92 R.R. Schubert for R.A. Carlson	
0-A	Replace page 43; the following sections were revised: Section 2.2, "Objective"  Curtailing operations if levels exceed 10% of the LEL in the boreholes. Section 2.3, "Requirement"  Requirement a. (second sentence:) Additional monitoring requirements if levels exceed 10% LEL in the borehole.  Requirement b. Curtailing of operations if levels exceed 10% LEL and implementation of actions identified in the work procedures. Section 2.5, "Recovery"  Failure to cease operations and implement the actions as required in the work procedures if combustible gas levels exceed 10% of the LEL shall...	Per telecon R.R. Schubert for J.R. Freeman Pollard	Per telecon 10-23-92 R.R. Schubert for R.A. Carlson	

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1. Measured dose rates of the drive barrel containing extracted soils shall not exceed 1.4 R/h at the side of the drive barrel on contact [window closed cutie pie (cp)]. Measured dose rates of the drive barrel containing extracted soils shall not exceed 2.0 R/h at the end of the drive barrel and on contact with the soil (window open cp).
2. If combustible gas levels exceed 10% of the lower explosive limit (LEL) in the borehole, drilling, sampling, welding, cutting and grinding operations shall cease. Actions required by the work procedures shall be implemented to reduce the combustible gas levels below 10% of the LEL before continuing operations (i.e., installation of purge bladder, purging borehole with inert gas, etc).
3. The total volume of soils removed from boreholes, where a potential exists to involve greater than 15 g of fissionable materials, are controlled in accordance with the criticality safety program as prescribed in WHC 1991d.

The following recommended prudent actions are management commitments towards ALARA implemented through work procedures and will be specified at each specific site. These commitments are documented in Radiation Work Permits (RWPs), Hazardous Work Operations Permit (HWOP), Job Safety Analysis (JSA), and other work procedures verified prior to start of operation by Safety Assurance.

1. Monitor ambient air in the workers breathing air zone for detection of toxic vapors in areas where workers will be required to perform their activities. Concentrations detected that exceed the time weighted average (TWA) limits should require removal of personnel from the work area or donning of appropriate protective gear as required by the HWOP, JSA, or RWP.
2. Use plastic liners or sleeving as barriers around the drive barrel, split spoon sampler and while loading the waste drums to prevent releases of contaminated or potentially contaminated radioactive materials.
3. Appropriate protective clothing as required by the site specific RWP and HWOP should be worn to protect the site worker.
4. Use field monitoring instruments to survey equipment for detection of any radioactive contamination.
5. Ensure double bagging and prompt control of contaminated equipment to minimize possibility of skin contaminations or inhalation hazards.
6. Change glove box gloves per the appropriate work procedures at the required frequency identified to minimize the potential for glove failures resulting in potential inhalation, skin or work site radioactive contamination hazards.

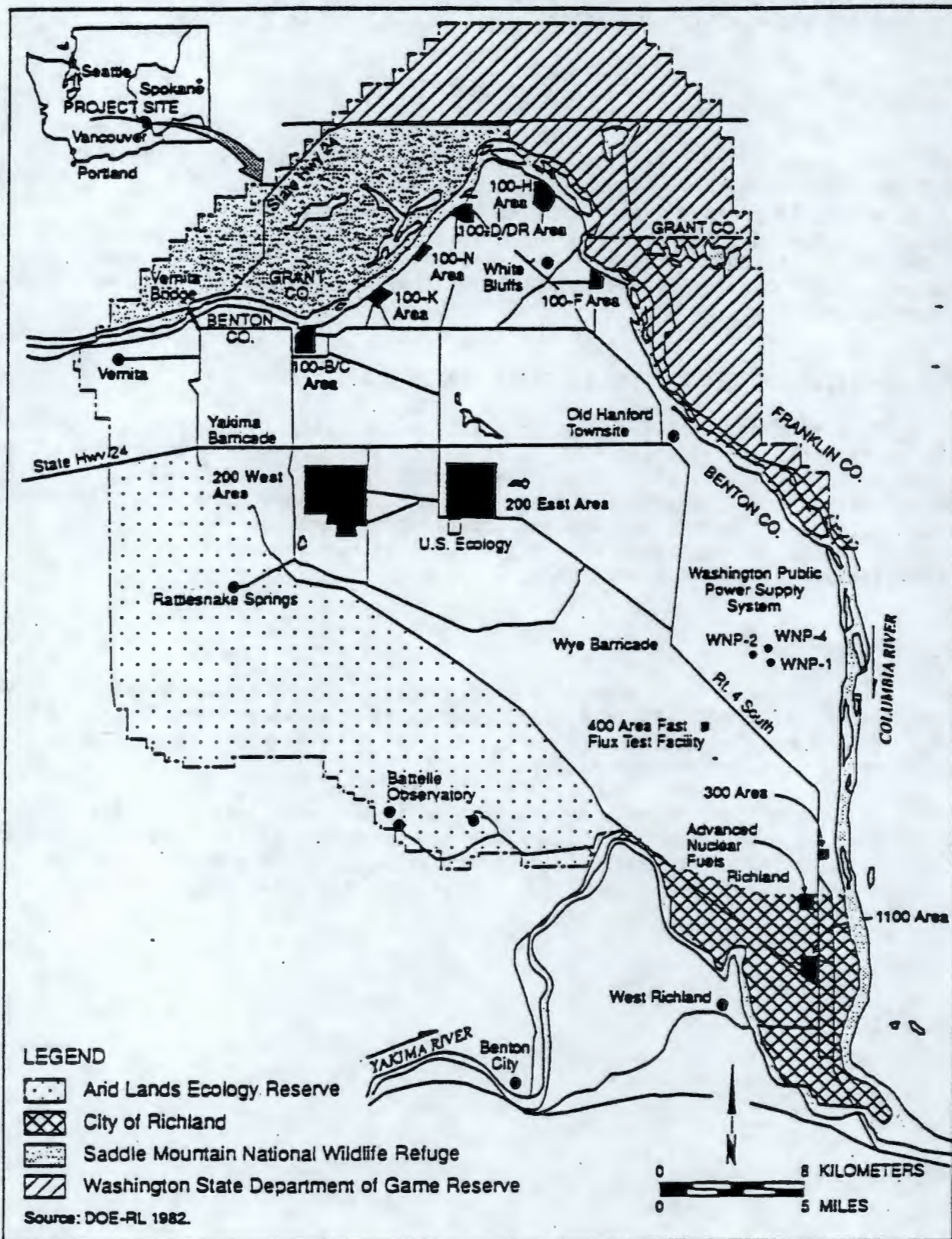
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7. Appropriate respiratory equipment should be available that protects the worker based upon the potential hazards at each work site.
- 8a. Use lead lined gloves and lead shielding at the glove box to minimize extremity and whole body exposures. Shielding should be used around waste drums when readings on contact, with exterior of drum surface, exceeds 100 mR/h.
- b. Use field monitoring instruments to establish dose rates associated with the radioactive materials being handled in the glove box per the requirements of the specific RWP.
- c. A radiation control area may be established and posted outside of the sample trailer, behind the glove box where an individual can receive a dose equivalent greater than 2 mR/h from the radiation source during glove box sampling operations.
9. A site specific evaluation should be conducted early in the planning process (i.e., readiness review) assessing chemical compatibility issues. This would identify sites that may have chemical inventories not analyzed as part of this assessment. This would eliminate potential chemical reactions that could result in production of volatile gases, fire or other adverse consequences.
10. Activities involving the use of acids should be conducted such that acids do not come into contact with the soils, potentially interacting with ferrocyanide that could result in generation of any hazardous volatile gases.
11. Survey measurements of drilling equipment and tools at non alpha sites should be conducted by the monitoring organization. Surfaces of equipment should not exceed an alpha reading of 7,000 dpm/100 cm<sup>2</sup>.
12. A zone of control should be established a minimum of 10 m (33 ft) or greater out from the well site to assure any potential consequences associated with this activity to the onsite worker are below the limits for a low hazard operation. Within the zone of control appropriate protective apparel should be used.
13. Stack effluent sampling should be conducted whenever split spoon samples are being handled in the glove box. This will aid in detecting a potential release of radioactive particulate while samples are being handled in the glove box.
14. Monitoring for flammable gases in areas at the tank farms where there may be welding and cutting activities should be in accordance with the requirements in the operating specification document for watch list tanks.

The activities planned as part of this characterization work are controlled by adherence to the operational safety limits (OSL) and work procedures contained in the *Environmental Investigations and Site*



Figure 1. Orientation of the Hanford Site.



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located at the center of the glove box it appears there is a greater reduction than when the source was close to the lead glass. A dose reduction factor of 2 was found through the lead impregnated gloves (Attachment F).

#### 4.4.2 Consequence Analysis

An analysis associated with the unmitigated radiological exposures to all individuals to determine the relative hazards was assessed to determine the potential consequences to the site worker, nearest onsite worker and the public. This analysis evaluated the consequences associated with each segment of the activities. Attachment G provides a discussion of the analysis addressing the potential consequences associated with an airborne release, and a maximum release scenario.

The analysis involves a maximum release to the atmosphere of hazardous material without consideration of mitigation provided by engineered or administrative barriers. Derived dose consequences are summarized in Table 5.

Table 5. Radiological Dose Consequences.

Receptor	Dose Consequences (EDE Rem)		Upper Limits for Low Hazard Operation (Rem)
Site Worker	2.0E-02		< 25
Onsite Worker	1-h release	2.6E-02	< 5
	8-h release	2.1E-01	
Public	1-h release	1.7E-03	< 0.5
	8-h release	1.4E-02	

#### 4.4.3 Summary

The requirements for determination of hazard classification (the radiological and toxicological dose consequences determined by this safety assessment) indicates that this activity will require review and approval for that of a low hazard operation. This safety assessment satisfies the requirements of WHC 1988b, WHC 1991c, and DOE Order 5481.1B, (DOE 1988b). The requirements considered also included the protection action guidelines that were developed to limit inhalation exposures to the public to levels below which they would not be expected to experience or develop irreversible or other serious health effects or symptoms that could impair their ability to take appropriate protective action (WHC 1990).

The assessed consequences have been evaluated against the radiological risk acceptance curve. The potential consequences are within the acceptance guidelines (WHC 1988b).

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4.5 ASSESSMENT OF HAZARDS AND CONTROLS

The consequence analysis indicated that several postulated events could result in consequences to the site and nearest onsite worker. Table 6 identifies the specific component failures or other off-normal conditions, consequences as a result of these failures, and mitigative features available to reduce or eliminate the potential consequences to the receptors of concern.

Table 6. Assessment of Hazards and Controls.

Hazards	Mitigation
Controlling inventories of soil materials within bounds of worst case anticipated.	The measured dose rates of a drive barrel should not exceed: a. 1.4R/h at the side of the drive barrel on contact (window closed CP). b. 2.0R/h at the end of the drive barrel on contact (window open CP).
Exposure of personnel to volatile gases and or potential deflagration or detonation.	A portable combustible gas analyzer should be used for detection of potentially flammable gases. Levels that exceed >10% of the LEL should require drilling, sampling, welding, cutting and grinding operations to stop. Actions as required by the work procedures, to reduce the combustible gas levels below 10% of the LEL, should be implemented before continuing operations.
Potential for encountering specific chemicals not previously analyzed as part of this assessment. Resulting consequences could cause chemical reactions (i.e., fire, explosion, volatile gases, etc.).	Evaluate chemical compatibility issues early in the planning process for each specific site if chemicals are encountered that were not previously assessed. Addendum or revision to existing safety assessment if warranted. Activities involving the use of acids should be conducted such that acids do not come into contact with soils at work sites near SSTs that are known to have contained ferrocyanide.
Removal of sufficient quantities of fissionable materials in the soils resulting in potential criticality safety issues at a specific site.	Evaluation of site specific inventories of fissionable materials that are known or suspected early in the planning process. Addendum or revision to the safety assessment if warranted.
Airborne radioactive particulate and contamination resulting in possible inhalation or skin contaminations.	Plastic liners or sleeving should be used as barriers around the drive barrel, split-spoon sampler and while loading spoils into waste drums to prevent releases of contaminated or potentially contaminated radioactive materials.  Appropriate protective clothing as required by the RWP and the HWOP should be worn to protect the site worker.  Survey equipment for detection of any contamination.  Double bagging and prompt control of contaminated equipment to minimize skin contaminations.  Decon glove box, change gloves and bags at the required frequency identified in the work procedures.  Appropriate respiratory equipment should be available based upon the potential hazards at each work site.  Additional administrative controls may be employed to assure site workers are protected from skin contamination hazards.
Exceeding exposure limits for safe contact handling while working in the glove box.	Leaded gloves and lead shielding may be used to minimize extremity and whole body exposures.  Instruments should be used to establish dose rates associated with the radioactive materials being handled in the glove box.
Encountering exposures outside of the sample trailer that could exceed the limits for a high radiation areas.	A radiation control area may be established and posted outside of the trailer behind the glove box, where an individual can receive a dose equivalent greater than 2 mR/h from the radiation source during glove box sampling operations.

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- 2.2 Objective - To assure that the drilling, sampling, welding, cutting, and grinding operations are curtailed when volatile gases are detected at levels that exceed >10% LEL in the boreholes.
- 2.3 Requirement -
- a. Use of portable combustible gas analyzers are required for detection of volatiles that are potentially flammable. Levels that exceed >10% of the LEL in the borehole shall require more frequent monitoring per the requirements of the applicable work procedures.
  - b. If combustible gas levels exceed >10% LEL in the borehole, drilling, sampling, welding, cutting and grinding operations shall cease. Actions required by the work procedures shall be implemented to reduce the combustible gas levels below 10% LEL before continuing operations (i.e., installation of purge bladder, purging of borehole volume with inert gas, etc).
- 2.4 Surveillance - The responsible operating organization shall verify daily (prior to startup and during periods of operations) that a calibrated combustible gas analyzer is in place and operable before weather caps are removed. Compliance with the stated requirements shall be documented in an auditable log or FAR.
- 2.5 Recovery
- 2.5.1 Noncompliance with the requirements of the OSL
- a. If a calibrated portable combustible gas analyzer is found not to be in place, work shall immediately cease (2.3a). Notification to the appropriate line and safety assurance management shall be made. Work shall not continue until a calibrated portable combustible gas analyzer is in place and operable.
  - b. Failure to cease operations and implement the actions as required in the work procedures if combustible gas levels exceed 10% of the LEL shall necessitate immediate shutdown of operations (2.3b). Notification shall be made to the appropriate line and safety management. Restart of operations shall require line management approval and safety assurance concurrence.
  - c. The OSL violation shall be documented as required by the applicable MRP.
- 2.6 Noncompliance with the surveillance requirement
- a. The surveillance shall be performed immediately.
  - b. If surveillance determines noncompliance with the requirement, the recovery actions identified in Section 2.5.1 shall be initiated.
  - c. Failure to implement a surveillance requirement shall be documented as required by the applicable MRP.

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- 2.7 **Audit Point** - An auditable log or FAR shall be maintained at the site documenting the results of the surveillance. The log shall be reviewed weekly by the operating organization assuring compliance with the requirements and surveillance.
- 2.8 **Basis** - The limits of this OSL are conservatively based on the potential volatile concentrations for potential gases that may be encountered but cannot be qualitatively predicted at this time. The concentration limits are set to provide a safety margin between detection and potential deflagration/detonation.

Operational Safety Limit 3 - Criticality Safety Control

- 3.0 **Title** - Site specific evaluations of fissionable materials inventories.
- 3.1 **Applicability** - This requirement applies to conducting an evaluation of inventories of fissionable materials that may be encountered at specific sites where soil sampling may occur.
- 3.2 **Objective** - To assure that the total quantity of soils removed at each specific site containing more than 15 g of fissionable materials are controlled under the criticality safety program (WHC 1991d).
- 3.3 **Requirement** - Line management shall be responsible for assuring:
- a. Sites identified where greater than 15 g of fissionable materials can be removed or relocated shall have CE&A involvement as required in WHC 1991d.
  - b. Inventories of fissionable materials that are planned to be handled in the sample trailer and glove box that could exceed 15 g shall have CE&A involvement as required in WHC 1991d.
- 3.4 **Surveillance** - The responsible operating organization shall verify early in the planning process (i.e., readiness review) for each site if there are inventories of fissionable materials that can be removed in the soils that require controls identified in WHC 1991d. This should be documented as part of the readiness review or in an auditable record.
- 3.5 **Recovery**
- 3.5.1 **Noncompliance with the requirements of the OSL**
- a. Start up of operations shall not be allowed at the affected site if the requirements of the OSL are not met. Notification to appropriate line and safety management shall be made.
  - b. An evaluation shall be conducted to ascertain what will be the inventories of fissionable materials in the volume of soils removed at the affected site. The appropriate reviews and approvals shall be obtained once the evaluation is completed.

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Function 10 - Activities involving the use of acids should be conducted such that acids do not come into contact with soils at work sites near SSTs that were known to contain ferrocyanide.

Prudent Action 10 - Acids should be controlled at the work site to prevent any interaction with ferrocyanide that could result in generation of hazardous volatile gases.

Function 11 - Surface radioactive measurements of equipment and tools.

Prudent Action 11 - The monitoring organization should conduct survey measurements at the surface of drilling equipment or tools at non alpha controlling sites. Surfaces of equipment should not exceed an alpha reading of 7,000 dpm/100 cm<sup>2</sup>.

Function 12 - Establishment of a zone of control.

Prudent Action 12 - A zone of 10 m (33 ft) or greater out from the well site should be established in all directions to assure that any potential consequences to the onsite worker are below the limits for a low hazard operation. Within this zone of control appropriate protective apparel should be utilized.

Function 13 - Sample stack effluent for detection of unanticipated releases.

Prudent Action 13 - Stack effluent sampling should be conducted whenever split spoon samples are being handled in the glove box. This will aid in detecting a potential release of radioactive particulate while samples are being handled in the glove box.

Function 14 - Monitor for flammable gases in areas at the tank farms where there may be welding and cutting activities.

Prudent Action 14 - Monitoring for flammable gases in areas at the tank farms should be in accordance with the requirements in the operating specification document for watch list tanks.

### 5.3 SAFETY SYSTEMS AND EQUIPMENT

The safety functions associated with the drilling/sampling, handling and preparation of samples in a sample trailer and glove box, and interim storage of soils extracted are identified as safety class 3. The systems, components, or structures identified below provide specific functions to assure treatment or confinement of radioactive or other hazardous materials (WHC 1988a):

1. Plastic liners or sleeving are barriers used to prevent releases of contaminated or potentially contaminated particulate. This minimizes the potential for radiological or toxicological exposures to occupational workers that exceed sound ALARA principles.
2. The HEPA filters function as a treatment and removal system. This system prevents the release of radioactive particulates and

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chemical vapors that could preclude implementing sound ALARA principles.

3. The instrumentation associated with sampling the stack effluent is required to detect unanticipated releases that could result in exposures to the occupational worker or environment that would preclude implementing sound ALARA principles.
4. The glove box and drum shielding provides a reduction of whole body and extremity exposures to the occupational worker. This would assure implementation of sound ALARA principles.
5. The glove box is designed to maximize confinement of radioactive materials. The integrity of this confinement system minimizes the potential for radioactive releases below the criteria limits as defined in WHC 1988b.

#### 6.0 REFERENCES

- DOE, 1988a, *Radiation Protection for Occupational Workers*, DOE Order 5481.11, U.S. Department of Energy, Washington, D.C.
- DOE, 1988b, *Safety Analysis and Review System*, DOE Order 5481.1B, U.S. Department of Energy, Washington, D.C.
- DOE/RL, 1991, *Expedited Response Action Proposal for 200 West Area Carvon Tetrachloride Plume*, DOE/RL-91-32, Draft B, U.S. Department of Energy, Richland, Washington.
- Kennedy, R. P. et al. 1990, *Design and Evaluation Guidelines for Department of Energy Facilities Subjected to Natural Phenomena Hazards*, UCRL-15910, U.S. Department of Energy, Washington, D.C.
- PNL, 1992, *Gross Gamma Logging for Westinghouse*, PNL-MA-567, GL-7A, Pacific Northwest Laboratories Hanford, Richland, Washington.
- Price, S. M., 1979, *Distribution of Plutonium and Americium Beneath the 216-Z-1A Crib: A Status Report*, RHO-ST-17, Rockwell Hanford Operations, Richland, Washington.
- RHO, 1979, *High Level Waste Leakage From the 241-T-106 Tank at Hanford*, RHO-ST-14, Rockwell International, Richland, Washington.
- WHC, 1988a, *Management Requirements and Procedures*, WHC-CM-1-3, Rev. 4, MRP 5.46, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1988b, *Nonreactor Facility Safety Analysis Manual*, WHC-CM-4-46, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1988c, *Radiation Protection Manual*, WHC-CM-4-10, Westinghouse Hanford Company, Richland, Washington

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WHC-SD-EN-SAD-016, REV 0-A  
VOLUME 1

- WHC, 1989, *Preliminary Operable Unit Designation Project*, WHC-EP-0216, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1990, *Emergency Plan*, WHC-CM-4-1, Rev. 2, Section 4.0, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1991a, *Geology and Hydrology of the Hanford Site: A Standard Text for Use in Westinghouse Hanford Company Documents and Reports*, WHC-SD-ER-TI-003, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1991b, *Guidance for Identifying and Documenting Conformance with DOE Design Criteria in Safety Analysis Reports*, WHC-SD-GN-ER-304, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1991c, *Implementation Guideline for Hazard Documentation*, WHC-SD-GN-ER-301, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1991d, *Nuclear Criticality Safety Manual*, WHC-CM-4-29, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1992a, *Environmental Investigations and Site Characterization Manual*, WHC-CM-7-7, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1992b, *Work Plan for Drilling and Sampling Activities Near Single Shell Tank 241-T-106 in Response to GAO-RCED-89-157*, WHC-SD-EN-AP-078, Rev 0, Westinghouse Hanford Company, Richland Washington.

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